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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/089,517	04/02/2003	Stephen I. Mann	0382.1450000	7824

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EXAMINER	
TRINH, SONNY	

ART UNIT	PAPER NUMBER
2687	

DATE MAILED: 05/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/089,517	MANN, STEPHEN I.	
	Examiner	Art Unit	
	Sonny TRINH	2687	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *9-12* is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 April 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/19/03*.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

Title:

The title of the invention has been changed from "EER TRANSMITTERS" to "IMPROVEMENTS RELATING TO EER TRANSMITTERS".

DRAWINGS:

New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the submitted drawings are from a PCT application which contains un-intelligible hand written labels. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Response to Arguments

1. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1-5, 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ernst et al. (U.S. Patent Number 4,972,440) in view of Zipper et al. (U.S. Patent Number 6,208,211).

Regarding **claim 1**, Ernst discloses an amplification system for a radio transmitter (abstract, column 1 lines 6-10) comprising:

a processing subsystem which determines envelope information and phase information from a baseband input signal (column 1 line 57 to column 2 line 23),

a phase modulator which generates a substantially constant amplitude signal having phase determined by the phase information (column 1 line 65 to column 2 line 9, column 2 lines 40-58),

an envelope modulator which generates an amplitude modulation signal determined by the envelope information (column 1 lines 28-36), and

an amplifier which generates an output signal from the constant amplitude signal, and the amplitude modulation signal (see figure 2 and description),

wherein the phase modulator includes a phase-lock-loop (figure 2, PLL 15, see column 4 line 55 to column 5 line 24).

However, Ernst does not explicitly disclose that the phase-lock-loop includes a frequency divider which is modulated according to the phase information.

In an analogous art, Zipper discloses a low jitter phase locked loop includes a frequency divider which is modulated according to the phase information (figure 1, columns 2-3).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to include, within the Ernst's system, the phase-lock-loop includes a frequency divider, as taught by Zipper, in order to integrate the frequency divider in the phase-locked loop circuit to simplify the circuit and to limit the noise generated by the PLL without altering output signal.

Regarding **claim 2**, the combination of Ernst and Zipper discloses the invention but does not explicitly disclose that the envelope modulator includes a pulse width modulator. However, pulse width modulation technique is a well known modulation technique and would have been obvious for a person of ordinary skill in the art to use a pulse width modulator since it is the most efficient form of envelope remodulation by varying the power supply voltage to the power amplifier. This is also known as high-level amplitude modulation (AM), and is most efficiently accomplished by means of pulse width modulation.

Regarding **claim 3**, Zipper further discloses that the frequency divider is modulated by the sigma delta modulator (figure 1, see description).

Regarding **claims 4-5**, the combination of Ernst and Zipper teaches the invention but does not disclose that processing subsystem modifies the envelope information

according to Cartesian feedback from the output signal of the amplifier and the processing subsystem modifies the phase information according to Cartesian feedback from the output signal from the amplifier. However, linear transmitters such as Cartesian feedback transmitters implemented using feedback loops around a power amplifier (PA) are well known and widely used and it would have been obvious and well within the level of a person of ordinary skill in the art to use Cartesian feedback to place the PA in a feedback loop in order to reduce, if not cancel, the PA non-linearities.

Regarding **claim 8**, the combination of Ernst and Zipper discloses the invention but does not explicitly disclose that the amplifier is part of the phase modulator. However, phase modulator can be very small when made from semiconductor materials, such as GaAs, and can be easily integrated with driving RF amplifiers on the same chip and the Examiner takes Official notice of such integration so that the circuitry can be minimized.

3. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ernst et al. (U.S. Patent Number 4,972,440) in view of Zipper et al. (U.S. Patent Number 6,208,211) and in further view of Cox et al. ("Cox"; International Application number WO 97/30521).

Regarding **claim 6**, the combination of Ernst and Zipper discloses the invention but does not disclose a pre-distorter that distorts the phase modulation of the output signal according to the envelope information according to feedback from the output signal.

In an analogous art, Cox teaches a linear transmitter using pre-distortion (abstract), Cox further teaches the pre-distortion that distorts of at least one of the phase modulation (page 3, line 27 to page 5 line 9).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to use, within the system of Ernst and Zipper, the pre-distorting of the envelope modulation of the output signal according to the feedback, as taught by Cox, in order to reduce the power amplifier non-linearities.

4. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ernst et al. (U.S. Patent Number 4,972,440) in view of Zipper et al. (U.S. Patent Number 6,208,211) and in further view of Kahn ("Kahn"; U.S. Patent Number 4,194,154).

Regarding **claim 7**, the combination of Ernst and Zipper discloses the invention but does not disclose that the processing subsystem pre-distorts the phase modulation of the output signal by modifying the phase information.

In an analogous art, Kahn teaches the method and means for compensating for the limited bandwidth of antennas and antenna coupling networks and other high powered modulated wave equipment characterized by generating a modulated wave at a relatively low power level, passing the modulated wave through circuitry which imparts the required envelope and phase modulation to the modulated wave to compensate for said limited bandwidth characteristics and then amplifying the resulting wave in amplifiers which substantially maintain the said imparted envelope and phase modulation and which feed the limited bandwidth equipment. Kahn further teaches the

steps of pre-distorting the phase modulation of the output signal by modifying the phase information (columns 5-6, specifically lines 60-66 of column 5).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to use, within the system of Ernst and Zipper, the pre-distorting of the phase modulation of the output signal by modifying the phase information, as taught by Kahn, so as to provide a substantially linear amplification characteristic over the operating range of the arrangement.

Allowable Subject Matter

5. **Claims 9-14** are allowed.

The following is an examiner's statement of reasons for allowance:

Regarding independent claims 9 and 12, the cited prior art fails to teach or suggest the claimed limitations with the reasons set forth in the Applicant's Remarks filed on 12/03/04, pages 7-10.

CONCLUSION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sonny TRINH whose telephone number is 571-272-7927. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester KINCAID can be reached on 571-272-7922. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

4/28/05

SONNY TRINH
PRIMARY EXAMINER